SEQUENCE LISTING

<110> National Research Council of Canada

<120> FATTY ACID ELONGASE (FAE) GENES AND THEIR UTILITY IN INCREASING ERUCIC ACID AND OTHER VERY LONG-CHAIN FATTY ACID PROPORTIONS IN SEED OIL

<130> PAT 989W-90

<140> Unknown
<141> 2004-11-24

<150> US 60/524,645
<151> 2003-11-25

<160> 27

<170> PatentIn version 3.2

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<223> F1 Forward Primer

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<212> PRT
<213> Tropaeolum majus

<400> 22

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Lys Gln Ser Val Asn Leu Lys Tyr Val Lys Leu Gly Tyr His Tyr Ser
            20                  25                  30

Ile Thr His Ala Met Tyr Leu Phe Leu Thr Pro Leu Leu Leu Ile Met
        35                  40                  45

Ser Ala Gln Ile Ser Thr Phe Ser Ile Gln Asp Phe His His Leu Tyr
    50                  55                  60

Asn His Leu Ile Leu His Asn Leu Ser Ser Leu Ile Leu Cys Ile Ala
65                  70                  75                  80

Leu Leu Leu Phe Val Leu Thr Leu Tyr Phe Leu Thr Arg Pro Thr Pro
                85                  90                  95

Val Tyr Leu Leu Asn Phe Ser Cys Tyr Lys Pro Asp Ala Ile His Lys
            100                 105                 110

Cys Asp Arg Arg Arg Phe Met Asp Thr Ile Arg Gly Met Gly Thr Tyr
        115                 120                 125

Thr Glu Glu Asn Ile Glu Phe Gln Arg Lys Val Leu Glu Arg Ser Gly
    130                 135                 140

Ile Gly Glu Ser Ser Tyr Leu Pro Pro Thr Val Phe Lys Ile Pro Pro
145                 150                 155                 160

Arg Val Tyr Asp Ala Glu Glu Arg Ala Glu Ala Glu Met Leu Met Phe
                165                 170                 175

Gly Ala Val Asp Gly Leu Phe Glu Lys Ile Ser Val Lys Pro Asn Gln
            180                 185                 190

Ile Gly Val Leu Val Val Asn Cys Gly Leu Phe Asn Pro Ile Pro Ser
        195                 200                 205

Leu Ser Ser Met Ile Val Asn Arg Tyr Lys Met Arg Gly Asn Val Phe
    210                 215                 220

Ser Tyr Asn Leu Gly Gly Met Gly Cys Ser Ala Gly Val Ile Ser Ile
225                 230                 235                 240

Asp Leu Ala Lys Asp Leu Leu Gln Val Arg Pro Asn Ser Tyr Ala Leu
                245                 250                 255

Val Val Ser Leu Glu Cys Ile Ser Lys Asn Leu Tyr Leu Gly Glu Gln
            260                 265                 270

Arg Ser Met Leu Val Ser Asn Cys Leu Phe Arg Met Gly Gly Ala Ala
        275                 280                 285

Ile Leu Leu Ser Asn Lys Met Ser Asp Arg Trp Arg Ser Lys Tyr Arg
    290                 295                 300
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Leu Val His Thr Val Arg Thr His Lys Gly Thr Glu Asp Asn Cys Phe
305                 310                 315                 320

Ser Cys Val Thr Arg Lys Glu Asp Ser Asp Gly Lys Ile Gly Ile Ser
                325                 330                 335

Leu Ser Lys Asn Leu Met Ala Val Ala Gly Asp Ala Leu Lys Thr Asn
            340                 345                 350

Ile Thr Thr Leu Gly Pro Leu Val Leu Pro Met Ser Glu Gln Leu Leu
        355                 360                 365

Phe Phe Ala Thr Leu Val Gly Lys Lys Val Phe Lys Met Lys Leu Gln
    370                 375                 380

Pro Tyr Ile Pro Asp Phe Lys Leu Ala Phe Glu His Phe Cys Ile His
385                 390                 395                 400

Ala Gly Gly Arg Ala Val Leu Asp Glu Leu Glu Lys Asn Leu Lys Leu
                405                 410                 415

Ser Ser Trp His Met Glu Pro Ser Arg Met Ser Leu Tyr Arg Phe Gly
            420                 425                 430

Asn Thr Ser Ser Ser Ser Leu Trp Tyr Glu Leu Ala Tyr Ser Glu Ala
        435                 440                 445

Lys Gly Arg Ile Lys Lys Gly Asp Arg Val Trp Gln Ile Ala Phe Gly
    450                 455                 460

Ser Gly Phe Lys Cys Asn Ser Ala Val Trp Lys Ala Leu Arg Asn Val
465                 470                 475                 480

Asn Pro Ala Glu Glu Lys Asn Pro Trp Met Asp Glu Ile His Leu Phe
                485                 490                 495

Pro Val Glu Val Pro Leu Asn
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<210> 23
<211> 1765
<212> DNA
<213> Tropaeolum majus

<400> 23

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tcactcatgc aatgtatctt tttctaaccc ctcttcttct cataatgtct gctcaaatct    180

caactttctc tattcaagat tttcaccatc tttataacca tcttatcctc cacaatctct    240

catcccttat cctatgcatc gctctcctcc tcttcgtctt aaccctctat ttccttactc    300

gtcccacgcc tgtttattta ctcaacttct cttgttacaa accggatgct attcacaaat    360

gcgaccgccg tcgtttcatg gacaccattc gtggaatggg tacttatacg gaagagaaca    420
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tcgagtttca aaggaaagtt ctagaaaggt ccggaatagg ggaatcgtct tatcttcctc 480

cgactgtgtt taaaattcct cctagggttt acgatgcgga ggaacgcgcg gaggctgaga 540

tgctgatgtt cggtgcggtt gatgggcttt tcgagaaaat atctgttaaa ccgaatcaaa 600

tcggggtttt ggttgtgaat tgtgggttgt ttaatccgat accgtcttta tcttccatga 660

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gatcgatgct tgtttccaac tgtttgtttc gaatgggtgg ggcggcgatt ttgctttcga 900

ataaaatgtc ggatcgatgg agatcaaagt atagattggt tcatacggtt cgaacccaca 960

agggtaccga ggataactgc ttttcttgcg taactagaaa ggaagactcg gacgggaaga 1020

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tcacaaccct cggaccactt gttctaccca tgtcggaaca attactcttc ttcgctactt 1140

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aaaaaaaaaa aaaaaaaaaa aaaaa 1765

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<211> 506
<212> PRT
<213> Crambe abyssinica

<400> 24

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Leu Phe Asn Leu Cys Phe Phe Pro Leu Thr Ala Ile Val Ala Gly Lys
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Ala Ser Arg Leu Thr Ile Asp Asp Leu His His Leu Tyr Tyr Ser Tyr
        35                  40                  45

Leu Gln His Asn Val Ile Thr Ile Ala Pro Leu Phe Ala Phe Thr Val
    50                  55                  60

Phe Gly Ser Ile Leu Tyr Ile Val Thr Arg Pro Lys Pro Val Tyr Leu
65                  70                  75                  80

Val Glu Tyr Ser Cys Tyr Leu Pro Pro Thr Gln Cys Arg Ser Ser Ile
                85                  90                  95

Ser Lys Val Met Asp Ile Phe Tyr Gln Val Arg Lys Ala Asp Pro Phe
            100                 105                 110

Arg Asn Gly Thr Cys Asp Asp Ser Ser Trp Leu Asp Phe Leu Arg Lys
        115                 120                 125

Ile Gln Glu Arg Ser Gly Leu Gly Asp Glu Thr His Gly Pro Glu Gly
    130                 135                 140

Leu Leu Gln Val Pro Pro Arg Lys Thr Phe Ala Ala Ala Arg Glu Glu
145                 150                 155                 160

Thr Glu Gln Val Ile Val Gly Ala Leu Lys Asn Leu Phe Glu Asn Thr
                165                 170                 175

Lys Val Asn Pro Lys Asp Ile Gly Ile Leu Val Val Asn Ser Ser Met
            180                 185                 190

Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Val Asn Thr Phe Lys
        195                 200                 205

Leu Arg Ser Asn Val Arg Ser Phe Asn Leu Gly Gly Met Gly Cys Ser
    210                 215                 220

Ala Gly Val Ile Ala Ile Asp Leu Ala Lys Asp Leu Leu His Val His
225                 230                 235                 240

Lys Asn Thr Tyr Ala Leu Val Val Ser Thr Glu Asn Ile Thr Tyr Asn
                245                 250                 255

Ile Tyr Ala Gly Asp Asn Arg Ser Met Met Val Ser Asn Cys Leu Phe
            260                 265                 270

Arg Val Gly Gly Ala Ala Ile Leu Leu Ser Asn Lys Pro Arg Asp Arg
        275                 280                 285

Arg Arg Ser Lys Tyr Glu Leu Val His Thr Val Arg Thr His Thr Gly
    290                 295                 300

Ala Asp Asp Lys Ser Phe Arg Cys Val Gln Gln Gly Asp Asp Glu Asn
305                 310                 315                 320

Gly Lys Thr Gly Val Ser Leu Ser Lys Asp Ile Thr Glu Val Ala Gly
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Arg Thr Val Lys Lys Asn Ile Ala Thr Leu Gly Pro Leu Ile Leu Pro
            340                 345                 350
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Leu Ser Glu Lys Leu Leu Phe Phe Val Thr Phe Met Ala Lys Lys Leu
        355                 360                 365

Phe Lys Asp Lys Val Lys His Tyr Tyr Val Pro Asp Phe Lys Leu Ala
    370                 375                 380

Ile Asp His Phe Cys Ile His Ala Gly Gly Arg Ala Val Ile Asp Val
385                 390                 395                 400

Leu Glu Lys Asn Leu Gly Leu Ala Pro Ile Asp Val Glu Ala Ser Arg
                405                 410                 415

Ser Thr Leu His Arg Phe Gly Asn Thr Ser Ser Ser Ser Ile Trp Tyr
            420                 425                 430

Glu Leu Ala Tyr Ile Glu Ala Lys Gly Arg Met Lys Lys Gly Asn Lys
        435                 440                 445

Val Trp Gln Ile Ala Leu Gly Ser Gly Phe Lys Cys Asn Ser Ala Val
    450                 455                 460

Trp Val Ala Leu Ser Asn Val Lys Ala Ser Thr Asn Ser Pro Trp Glu
465                 470                 475                 480

His Cys Ile Asp Arg Tyr Pro Val Lys Ile Asp Ser Asp Ser Ala Lys
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Ser Glu Thr Arg Ala Gln Asn Gly Arg Ser
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<212> DNA
<213> Crambe abyssinica

<400> 25

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gcctttaccg ttttcggttc gattctctac atcgtgaccc ggcccaaacc ggtttacctc    240

gttgagtact catgctacct tccaccaacg cagtgtagat caagtatctc caaggtcatg    300

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tcctggcttg acttcttgag gaagattcaa gaacgttcag gtctaggcga cgaaactcac    420

ggccccgagg gactgcttca ggtccctccc cggaagactt ttgcggcggc gcgtgaagag    480

acggagcaag taatcgtcgg tgcgctgaaa aatctattcg agaacaccaa agttaaccct    540

aaagatatag gtatacttgt ggtgaactca agcatgttta atccaactcc ttcactctca    600

gcgatggtcg ttaatacttt caagctccga agtaacgtaa gaagctttaa ccttggtggc    660
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<212> PRT
<213> Arabidopsis sp.

<400> 26

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Ala Ser Arg Leu Thr Ile Asn Asp Leu His Asn Phe Leu Ser Tyr Leu
35 40 45

Gln His Asn Leu Ile Thr Val Thr Leu Leu Phe Ala Phe Thr Val Phe
50 55 60

Gly Leu Val Leu Tyr Ile Val Thr Arg Pro Asn Pro Val Tyr Leu Val
65 70 75 80

Asp Tyr Ser Cys Tyr Leu Pro Pro Pro His Leu Lys Val Ser Val Ser
85 90 95

Lys Val Met Asp Ile Phe Tyr Gln Ile Arg Lys Ala Asp Thr Ser Ser
100 105 110

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Arg Asn Val Ala Cys Asp Asp Pro Ser Ser Leu Asp Phe Leu Arg Lys
        115                 120                 125

Ile Gln Glu Arg Ser Gly Leu Gly Asp Glu Thr Tyr Ser Pro Glu Gly
    130                 135                 140

Leu Ile His Val Pro Pro Arg Lys Thr Phe Ala Ala Ser Arg Glu Glu
145                 150                 155                 160

Thr Glu Lys Val Ile Ile Gly Ala Leu Glu Asn Leu Phe Glu Asn Thr
                165                 170                 175

Lys Val Asn Pro Arg Glu Ile Gly Ile Leu Val Val Asn Ser Ser Met
            180                 185                 190

Phe Asn Pro Thr Pro Ser Leu Ser Ala Met Val Val Asn Thr Phe Lys
        195                 200                 205

Leu Arg Ser Asn Ile Lys Ser Phe Asn Leu Gly Gly Met Gly Cys Ser
    210                 215                 220

Ala Gly Val Ile Ala Ile Asp Leu Ala Lys Asp Leu Leu His Val His
225                 230                 235                 240

Lys Asn Thr Tyr Ala Leu Val Val Ser Thr Glu Asn Ile Thr Gln Gly
                245                 250                 255

Ile Tyr Ala Gly Glu Asn Arg Ser Met Met Val Ser Asn Cys Leu Phe
            260                 265                 270

Arg Val Gly Gly Ala Ala Ile Leu Leu Ser Asn Lys Ser Gly Asp Arg
        275                 280                 285

Arg Arg Ser Lys Tyr Lys Leu Val His Thr Val Arg Thr His Thr Gly
    290                 295                 300

Ala Asp Asp Lys Ser Phe Arg Cys Val Gln Gln Glu Asp Asp Glu Ser
305                 310                 315                 320

Gly Lys Ile Gly Val Cys Leu Ser Lys Asp Ile Thr Asn Val Ala Gly
                325                 330                 335

Thr Thr Leu Thr Lys Asn Ile Ala Thr Leu Gly Pro Leu Ile Leu Pro
            340                 345                 350

Leu Ser Glu Lys Phe Leu Phe Phe Ala Thr Phe Val Ala Lys Lys Leu
        355                 360                 365

Leu Lys Asp Lys Ile Lys His Tyr Tyr Val Pro Asp Phe Lys Leu Ala
    370                 375                 380

Val Asp His Phe Cys Ile His Ala Gly Gly Arg Ala Val Ile Asp Glu
385                 390                 395                 400

Leu Glu Lys Asn Leu Gly Leu Ser Pro Ile Asp Val Glu Ala Ser Arg
                405                 410                 415

Ser Thr Leu His Arg Phe Gly Asn Thr Ser Ser Ser Ser Ile Trp Tyr
            420                 425                 430
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Glu Leu Ala Tyr Ile Glu Ala Lys Gly Arg Met Lys Lys Gly Asn Lys
435 440 445

Ala Trp Gln Ile Ala Leu Gly Ser Gly Phe Lys Cys Asn Ser Ala Val
450 455 460

Trp Val Ala Leu Arg Asn Val Lys Ala Ser Ala Asn Ser Pro Trp Gln
465 470 475 480

His Cys Ile Asp Arg Tyr Pro Val Lys Ile Asp Ser Asp Leu Ser Lys
485 490 495

Ser Lys Thr His Val Gln Asn Gly Arg Ser
500 505

<210> 27
<211> 1521
<212> DNA
<213> Arabidopsis sp.

<400> 27

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attttctacc aaataagaaa agctgatact tcttcacgga acgtggcatg tgatgatccg 360

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gctatggtcg ttaatacttt caagctccga agcaacatca aaagctttaa tctaggagga 660

atgggttgta gtgctggtgt tattgccatt gatttggcta aagacttgtt gcatgttcat 720

aaaaacactt atgctcttgt ggtgagcact gagaacatca cacaaggcat ttatgctgga 780

gaaaatagat caatgatggt tagcaattgc ttgtttcgtg ttggtggggc cgcgattttg 840

ctctctaaca agtcgggaga ccggagacgg tccaagtaca agctagttca cacggtccga 900

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gctaccttcg tcgccaagaa acttctaaag gataaaatca agcattacta tgttccggat 1140

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